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Rate of Return and Investment Profitability

One of a series of papers
on medium and long-term
economic issues

April 1980

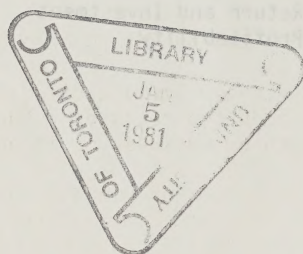
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PREFACE

During periods of high inflation, reported profits do not provide a satisfactory measure of real profitability and, thus, of the strength or weakness of incentives to invest. This is because current accounting practice makes no allowance for the various hidden costs and gains to firms that arise in an inflationary environment. The paper shows that inflation-adjusted profits during the 1970s were significantly lower than reported profits.

The paper examines profits and real rates of return in different sectors of the economy, with particular emphasis on real rates of return in the energy and non-energy-producing sectors. Over the period since 1974, real rates of return have remained fairly high in the energy sector, but have fallen significantly in the non-energy sectors. The evidence available suggests that higher energy prices contributed significantly to the fall in rates of return in the non-energy-producing sectors.

The paper also examines the behaviour of three other financial indicators: the debt/equity ratio, the earnings/price ratio, and the ratio of the market value of capital to its replacement value. These indicators and the estimates of inflation-adjusted rates of return are used to study the evolution of the strength or weakness of incentives to invest.

The paper was prepared in the Long Range and Structural Analysis Division under the general direction of Scott Clark, Director of the Division. The paper has benefitted substantially from the comments of other members of the Department of Finance, as well as from discussions with persons at the Department of Energy, Mines and Resources and the Economic Council of Canada and faculty members at Carleton University and the University of Western Ontario. The responsibility for the views expressed in this paper, however, rests entirely with the authors.

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1. INTRODUCTION

The medium-term macroeconomic projection published recently by the Department of Finance anticipated that business non-residential investment would provide a significant share of the support to growth over the period 1979-1985(1). Business non-residential investment was projected to grow by over 6 per cent per year, and to be the strongest growth component of aggregate demand over the medium term. In contrast, business non-residential investment in constant 1971 dollars fell by 0.4 per cent in 1976 and increased by only 1.2 per cent and 1.1 per cent respectively in 1977 and 1978. The projected strong growth of business non-residential investment thus represents a significant recovery from the performance over the 1976-1978 period.(2)

An important issue in assessing the feasibility of the projected investment performance over the medium term concerns the profitability of investment in new physical assets. Unless rates of return on new physical assets are high enough to make additions to capacity profitable, investment may remain depressed. The resulting supply bottlenecks would hold back output expansion and convert additions to demand into increased inflationary pressures and widening current account deficits.

This paper examines the evolution of rates of return on equity capital in the non-financial corporate sector since the early 1960s. Section 2 reviews possible links between average rates of return on equity and incentives to invest. The use of rates of return to study the evolution of incentives to invest, however, first requires that some adjustments be made to reported profits and equity. This is because current accounting practice makes no allowance, in the calculation of income and equity, for various hidden costs that arise in an inflationary environment. The adjustments that must be made to reported profits are summarized in Section 3.

Section 4 reviews the evolution of rates of return on equity over the period 1963-1979. Both reported and inflation-adjusted rates of return fell significantly in the mid-1970s. However, while reported rates of return remained relatively high by past standards and, in the first three quarters of 1979, rose to their highest level since the early 1960s, inflation-adjusted rates of return during that period fell significantly below their average since the early 1960s. Real (inflation-adjusted) rates of return, however, recovered strongly in late 1978-early 1979 as capacity utilization rates rose strongly in some sectors of the

(1) The Economic Assumptions Underlying the Fiscal Projections of the Budget, Department of Finance, December 11, 1979.

(2) A substantial recovery in business non-residential investment occurred in 1979 with real growth of over 10 per cent.

economy and, reflecting in part the impact of the depreciation of the dollar on revenues from sales, average selling prices increased faster than factor costs.

In view of the strong performance projected for investment in the non-energy sector over the next few years, an important issue concerns the effect of higher energy prices on rates of return in the non-energy sector. Section 5 examines the evolution of rates of return in the energy, manufacturing and other non-energy-producing sectors. Over the period since 1974, inflation-adjusted rates of return have remained fairly high in the energy sector, but have fallen significantly in the non-energy sectors. The evidence available suggests that higher energy prices contributed significantly to the fall in rates of return in the non-energy-producing sectors.

Section 6 examines the behaviour over the period 1963-1979 of three other financial indicators: the debt/equity ratio, the earnings/price ratio, and the ratio of the market value of capital to its replacement value. These indicators are examined with a view to assessing whether there may have been, in recent years, a structural change in the supply cost of investment capital. Such a structural change could offset the impact of recent higher rates of return on investment spending. While the evidence available is incomplete, the indicators examined suggest that the recovery of rates of return in 1978-1979 should have resulted in a corresponding strengthening of incentives to invest.

The main conclusions of the paper are summarized in Section 7.

2. PROFITS AND INCENTIVES TO INVEST

The physical assets held by a firm yield to its owners - its stockholders - a stream of income or profits over time. These net earnings may be paid out to stockholders in the form of dividends or may be reinvested in the firm, in which case stockholders benefit from capital gains as their stocks appreciate. The ratio of this stream of annual profits to the value of the owners' financial investment in the firm is referred to as the rate of return on equity.⁽¹⁾

From the point of view of corporate management and shareholders, the decision to invest in new capital assets must be based on the expected impact of the investment on the firm's stream of annual earnings or profits. An expansion of real assets will be worth undertaking from the point of view of the current owners of a firm only if the investment leads to an increase in the current value of their holdings or, in other words, only if the acquisition of the assets adds more to the expected value of future earnings of the firm than the cost of acquiring the assets. This test will be satisfied if the expected return from the investment exceeds the marginal cost of capital to the firm.

In theory, if the expected rate of return on new physical assets exceeds the cost of capital to the firm, investment in new physical assets should be undertaken up to the point at which the two measures are equal. Equilibrium levels of investment occur when the rate of return on capital is equal, at the margin, to the supply price of investment funds. Incentives to invest could thus be strengthened or weakened as a result of either a change in the profitability of capital or a change in the supply cost of investment funds. An upward shift in the profitability of capital should result in increased investment and subsequently should result in a higher equilibrium value for the cost of capital as well, reflecting the fact that a larger supply of investment funds will be forthcoming only if returns to savers are raised. Similarly, a fall in the cost of capital will induce further investment until the rate of return on capital has fallen sufficiently to be once again equal to the supply cost of capital in the new equilibrium.

There are, however, several difficulties in applying such a conceptual framework to an empirical study of incentives to invest. First, the relevant rate of return from the point of view of investors is the anticipated or expected rate of return over the life of the asset, rather than the ratio of net income or profit to equity (i.e., the

(1) Equity is defined as the sum of common and preferred shares, retained earnings and revaluation gains on net fixed assets. Alternatively, equity could be defined as the difference between total assets and total liabilities. Both definitions are equivalent and represent shareholders' equity.

measured rate of return) at any point in time. Second, the relevant rate of return from the point of view of investors is the rate of return on new assets (i.e., the marginal rate of return), rather than the average rate of return on existing assets. Third, the cost of capital is also extremely difficult to measure correctly. The cost of funds to the firm can be considered as an average of the costs of debt and equity, weighted by the proportions of the two in the firm's desired capital structure. For empirical measurement, however, neither the firm's desired capital structure nor the cost of equity capital (equal to the inverse of the capitalization rate at which market investors discount the firm's stream of expected earnings) is directly observable.

Since neither the rate of return relevant to assess the strength or weakness of incentives to invest (i.e. the expected marginal rate of return), nor the cost of capital, is directly observable, the strength or weakness of incentives to invest must instead be inferred somehow from what is observable. The main observable indicator of the strength of incentives to invest examined in this paper is the average rate of return on equity.

Average rates of return on equity may provide useful (though partial) indications of the strength of incentives to invest. First, from the point of view of the profitability of new physical assets, movements in marginal rates of return may parallel movements in average rates of return on existing assets. For example, in periods of slow aggregate demand growth, it is probable that surplus capacity and falling or slowly increasing prices would reduce rates of return on both existing and new assets, thus discouraging short-term expansion plans. The reverse would occur in periods of strong aggregate demand growth.

In some situations, however, average rates of return on existing assets could differ systematically from expected rates of return on new assets. For example, unanticipated changes in relative prices, such as happened as a result of the large increases in energy prices since the mid-1970s, could lower rates of return initially on existing assets. With the use of different technologies to economize on the use of energy, however, rates of return on new physical assets could remain high, even though rates of return on existing assets are depressed. Thus, while average rates of return could remain relatively low for some time following the change in relative prices, marginal rates of return, following a period of adjustment, could be equal to, or even higher than, the rates of return that existed prior to the price change.

Second, the availability of sufficient internal funds for expansion is often seen as a major determinant of corporate investment. While empirical evidence suggests that the availability of sufficient internal funds does not affect the desired capital stock, several studies have found that cash flow influences the speed with which firms eliminate the gap between the desired and actual capital stock. The preference of corporate managers and shareholders for financing investment, in part at least, through internally generated funds could reflect the fact that too large a reliance on external funds could depress share prices either if such lower prices were necessary to find new stockholders or if a larger reliance than usual on borrowed funds raised the firm's debt/equity ratio above what market investors consider appropriate

or prudent. Cash flow thus may act as a constraint on the volume of investment expenditure and hence as a determinant of its timing.

Table 1 shows the breakdown of funds available between internal and external sources for the private non-financial business sector over the period 1963-1978. As can be seen from the table, funds from internal sources accounted for about 30 per cent of total funds available in the 1960s and for about 40 per cent in the 1970s. This suggests that, on average, firms finance a fairly large portion of their expenditures from retained earnings. Large fluctuations in the availability of retained earnings could thus result in significant changes in investment spending.

Table 1

Availability of Funds from Internal and External Sources, Private Non-Financial Business Sector, Canada, 1963-1978

	External Sources			Internal Sources(2)
	Equities	Bonds	Other(1)	
	(Per cent)			
1963-65	14.0	14.5	39.6	31.9
1966-70	14.9	15.7	38.5	30.9
1971-75	6.9	11.1	42.8	39.2
1976	6.0	13.7	41.1	39.2
1977(3)	7.7	11.9	36.9	43.9
1978(3)	7.7	9.1	41.5	41.7

- (1) Includes bank loans, commercial paper and bankers' acceptances, commercial loans of sales finance companies, lending by financial institutions affiliated with foreign banks, business loans from government, mortgages, and direct investment from abroad.
- (2) Profits after dividends and taxes. Includes deferred taxes.
- (3) In 1977 and 1978, funds raised through issues of term-preferred shares were included in financing from other external sources rather than under financing from issues of equities.

Source: Statistics Canada, Industrial Corporations: Financial Statistics, Cat. 61-003, and Department of Finance.

Average rates of return on equity, however, provide only partial indications of the strength of incentives to invest. Incentives to invest depend on the interaction between rates of return on new incremental capital and the supply cost of investment funds. While changes in average rates of return on equity may, themselves, influence the supply cost of investment funds through their effect on the availability of funds from internal sources, this supply cost also depends on other factors. In particular, the availability of savings, relative rates of return on alternative financial investments, attitudes toward risk and the perceptions of market investors concerning the level and certainty of future earnings will influence the supply cost of funds for investment

in new capital assets. Changes in these factors would result in changes in the supply cost of investment funds. The impact of changes in marginal rates of return on incentives to invest could be offset by independent changes in the supply cost of investment funds. The evolution of the supply cost of capital in recent years remains an important area for future research.

3. THE MEASUREMENT OF RATES OF RETURN

At the conceptual level, profits are defined as the excess of earnings over costs of production. In practice, however, the measurement of profits is by no means straightforward and several issues must be resolved before a measure of profitability can be estimated. First, a decision must be made on whether earnings and payments flows are to be measured on a realized or an accrued basis. Second, capital income is earned in practice on both domestic and foreign holdings of physical and financial assets. The assets whose income is being estimated must be defined. Third, there are several claimants on the assets and income flows of a firm, including bondholders, banks and other short-term lenders, and preferred and common stockholders. The entity whose income is being estimated must therefore also be defined.

Corporate income measures may be used for a wide variety of purposes. They may be used for the assessment of tax liabilities, as a guide to allocation and management performance, or, at the aggregate level, as a basis to study the functional and personal distribution of income. Clearly, no single concept or measure of income need be optimal for all these uses. For example, concepts or measures more appropriate for income or welfare comparisons may not be appropriate for the study of incentives to invest. The choice of a particular definition of profits will thus be dictated by the nature of the issue being studied.

First, in conformity with current accounting practice, the definition of income used in estimating the rates of return presented below is based on the "going concern" assumption, according to which the firm will continue in its particular productive activity indefinitely. This assumption sets the logic for the realization-accrual choice. Second, in view of the interest in assessing incentives for investment in Canada, profits (and the corresponding capital stock) are defined, to the extent possible, to exclude earnings on foreign assets. In practice, relative rates of return probably play a significant role in decisions of where to invest. Thus, a fall in domestic rates of return may not reduce the relative attractiveness of domestic investments if foreign rates of return also decline. However, unless the marginal cost of capital falls correspondingly, the overall attractiveness of investment would be reduced. Third, rates of return on equity measure the profitability of stockholding only. Although both stockholders and bondholders share the earnings stream from corporate assets, equity owners dictate the operation of a firm. From the point of view of corporate management, the decision to invest in new capital assets must be based on the expected impact of the investment on the value of the stockholders' equity.

In a non-inflationary environment, the above definitional decisions would be sufficient to proceed with the estimation of rates of return on equity. In an inflationary environment, however, rates of return

estimated directly on the basis of reported profits data would likely present a distorted picture of the firm's profitability and ability to finance future investments. This is because the use of historic cost accounting valuation in current accounting practice does not, in an inflationary environment, properly measure some of the costs of production. In some cases, current accounting practice overstates costs of production while, in other cases, these costs are understated. In order to obtain measures of genuine profits, reported profits must be adjusted for these "errors" of measurement.

The measurement of genuine rates of return on equity requires that reported earnings be adjusted for four sources of error. First, present accounting practice values the cost of wear and tear on physical assets used in production on the basis of the historical or acquisition price of assets. With increases in the price of new assets, however, this procedure clearly understates the actual cost to the firm of using these physical assets. From this point of view, current accounting practice understates production costs. In order to obtain a measure of profits that properly deducts from earnings the cost in current dollars of using up fixed capital assets, reported depreciation charges must be increased for the difference between acquisition prices and the prices of the period in which the capital is in fact used.(1)

Second, present accounting practice also values materials used in production at acquisition costs. In an inflationary environment, this procedure results in an understatement of the cost of materials used from inventory. A similar problem arises in the case of goods sold from inventory. The two methods of inventory accounting used most frequently by non-financial corporations are the FIFO (first in - first out) and the average-price-costing methods. Under the more widely used FIFO method, materials consumed, or finished goods sold from inventory, are charged against revenue in the order of their acquisition or production. Under the average-price-costing method, materials used up in current production, or finished goods sold from inventory, are valued at the average price of all items held in inventory. In an inflationary environment, both methods of costing understate current replacement prices. In order to obtain a measure of profits that properly deducts from earnings the current cost of production of items sold, reported costs must be increased for the difference between the accounting and current dollar prices of materials used and goods sold from inventory.

(1) It should be noted that it is not known how accurately depreciation charges reported in financial statements measure the actual cost to the firm of using its physical assets. To the extent that actual and reported depreciation differ significantly, estimated profits and rates of return based on reported financial statements measure only imperfectly true profits and rates of return. The evidence available, however, suggests that the depreciation procedures used for financial statement purposes in the non-financial corporate sector have remained quite stable over time. Unless reported and actual costs are fairly close, firms continuously understate or overstate costs of production.

Third, in an inflationary environment, firms must continuously add to their nominal holdings of working capital to maintain the latter's precautionary and liquidity value. Present accounting practice makes no allowance for this cost of operations. In order to obtain a measure of profits that properly deducts from earnings the current cost of operations, increases in the nominal value of working capital balances required to maintain their precautionary or liquidity value intact must be added to reported costs.

Lastly, present accounting practice deducts from earnings all interest payments as a cost of borrowed capital. In an inflationary environment, however, this overstates the actual cost to the firm of borrowed funds. To the extent that inflation is anticipated fully (and correctly) nominal rates of interest are raised commensurate with rates of inflation to ensure both that lenders continue to receive adequate real returns and, leaving aside the possible effect of taxation, that the real value of their capital is not eroded. In this case, the higher nominal rates of interest are made up of two components: a payment to the lender for the use of his funds (equal to the prevailing real rate of interest) and a payment to the lender to compensate him for the fall in the real value of his financial claim (equal to the rate of inflation). This latter portion, the portion corresponding with the increase in the rate of interest to reflect inflation, is in fact a repayment of principal, identical in all respects with other repayments of principal specified in the loan's terms.⁽¹⁾ Like other repayments of principal, this portion of nominal interest payments is not a cost of borrowed funds and thus should not be deducted from earnings in estimating profits.^(2,3)

(1) Thus, in an inflationary environment, the repayment of the lender's claim in real terms comprises two parts: first, the repayments specified in the loan's terms (equal to the nominal value of the original loan); and, second, annual payments (equal to a portion of annual interest payments) to compensate the lender for the expected decline in the real value of his claim during the life of the loan.

(2) If the rate of inflation is unanticipated or is incorrectly anticipated, nominal interest receipts no longer provide the lender with a normal real yield after allowing for the appropriate capital maintenance provision. Any positive differential between actual inflation and the expected rate of inflation results in a transfer of real wealth from lenders to borrowers. From the point of view of the firm, however, the measurement of genuine net earnings still requires that a capital maintenance equivalent provision (once again equal to the value of debt claims times the rate of inflation) be deducted from nominal interest payments since the unrepaid portion of the decline in the real value of debt claims increases the firm's real wealth and should be treated in the same manner as other forms of income. The measurement of genuine net earnings thus requires that reported interest payments be adjusted for the rate of inflation whether the latter is anticipated or not.

(3) Similarly, interest receipts on the firm's holdings of interest-bearing assets include a repayment of principal. This repayment of principal should not be considered as part of the firm's income.

The "inflation adjustments" to reported earnings described above yield a measure of operating profits which properly represents the surplus resulting from current operations. In measuring net output, the costs of using up fixed capital assets and materials have been charged against earnings at the prices of the period in which the fixed capital and the materials were in fact used. Adjustments are also made to the reported cost of borrowed capital and the cost of maintaining the real value of working capital balances. The resulting measure of income properly measures the average profitability of share capital in any given period. To the extent that movements in average profitability provide useful indications of movements in the profitability of new assets, movements in the rate of return series based on inflation-adjusted profits are an important indicator of the profitability of investment.

Inflation-adjusted profits also represent the amounts which the firm can properly distribute to shareholders or retain to finance expansion. From the point of view of the firm's ability to finance expansion from internally generated funds, inflation-adjusted profits and the associated rate of return are the relevant indicators of profitability.

The inflation adjustments described above do not include all of the adjustments that have been suggested in the economic literature.(1) In particular, reported earnings are not adjusted for accrued (but unrealized) real capital gains or losses on the firm's assets. For example, real capital gains accrue to the owners of capital whenever the market prices of plant and equipment, land and inventories rise relative to the general price level. Such changes in relative prices notionally increase the real wealth of investors. For income or welfare comparisons aimed at measuring the real command of investors over resources, these gains or losses should be considered as income. This is the Haig-Simons concept of income, defining income as "the amount by which the value of a person's store of property rights would have increased, as between the beginning and the end of the period, if he had consumed (destroyed) nothing".(2) Under this definition, income would include all increases in real net worth.

The Haig-Simons concept of income underlies the purchasing power accrual approach to inflation adjustments.(3) However, while individual investors could in principle realize these capital gains by selling their ownership

(1) Good presentations of the issues involved can be found in John Bossons, The Impact of Inflation on Income and Financing of Large Non-Financial Corporations, Paper prepared for the Ontario Committee on Inflation Accounting, Supplementary Paper No. 5, June 1977; John B. Shoven and Jeremy I. Bulow, "Inflation Accounting and Non-Financial Corporate Profits: Physical Assets", Brookings Papers on Economic Activity (3:1975), and "Inflation Accounting and Non-Financial Corporate Profits: Financial Assets and Liabilities", Brookings Papers on Economic Activity (1:1976); and Canadian Institute of Chartered Accountants, Accounting Research Committee, Current Cost Accounting, December 1979.

(2) Henry C. Simons, Personal Income Taxation, University of Chicago Press, 1938, p. 39.

(3) In contrast, the approach to inflation adjustment used in this paper is generally referred to as the capital maintenance approach.

claims, the firm as an ongoing business cannot realize these gains immediately and continue operations. To realize the capital gains accrued as a result of an increase in the relative price of fixed capital equipment, the firm would have to sell the equipment and thus discontinue production. From the point of view of the analysis of incentives to invest, these accrued (but unrealized) capital gains and losses are irrelevant unless the firm's borrowing capacity is correspondingly affected. The inflation-adjusted rates of return shown below adjust reported earnings only for capital gains and losses realized in the course of the firm's current operations.

The fact that different concepts of income can all be correct, depending on the purpose for which income is measured, is reflected in the controversy in the accounting profession and among economists as to the appropriate nature of the inflation adjustments that should be made to financial statements. Without adjustments, however, reported profits are likely to present a distorted picture of corporate income.

4. RATES OF RETURN IN THE NON-FINANCIAL CORPORATE SECTOR

This section examines the behaviour of average rates of return in the private non-financial corporate sector over the period 1963-1979. For 1979, data for only the first three quarters are available. The adjustments made to reported profits to analyse the evolution of incentives to invest in the Canadian non-financial corporate sector were complex and, because of the quality of the data, may be subject to considerable error.⁽¹⁾ Notwithstanding these difficulties, the adjusted rates of return still provide a superior basis for meaningful analysis of profitability although, because of the data limitations, changes in the estimated rates of return may be more reliable than the estimated levels themselves. In the discussion below, both before-tax and after-tax rates of return are examined, as well as average effective corporate tax rates.

4.1 Before-Tax Rates of Return

Before-tax average rates of return are shown in Chart 1. The chart includes both reported and inflation-adjusted rates of return.^(2,3)

(1) The estimates of rates of return are based primarily on data from Industrial Corporations: Financial Statistics, Statistics Canada, Cat. 61-003. The nature of the adjustments and the data sources are discussed in the Appendix and in a technical background note which can be obtained from the Long Range and Structural Analysis Division, Department of Finance.

(2) In 1977, the list of corporations included in the Statistics Canada sample was revised on the basis of the 1974 corporate population. Overlapping estimates of rates of return can be constructed for the period 1975-1977. Both the unrevised and revised estimates are shown in the chart. For 1979, only data for corporations with \$10 million or more in assets are available. The estimated rate of return shown for 1979 is based on the assumption that the rates of return for the narrower and broader corporate populations moved in a parallel fashion.

(3) What are referred to here as reported rates of return differ from rates of return calculated directly on the basis of reported income and equity data. This is because various (non-inflationary) adjustments were made to both income statements and balance sheet data before rates of return were calculated. First, holdings of foreign financial assets and related income were removed from the financial statements. Second, adjustments were made to eliminate double-counting of intercorporate shareholdings and minority shareholders' interest inherent in aggregations of individual corporate statements. Third, deferred tax liabilities were treated as equity rather than as liabilities to reflect the view that, for firms that are going concerns, such taxes are unlikely ever to be paid. More detailed discussion of these adjustments is contained in Appendix II and in the technical background note.

Two periods can be easily identified: the period 1963-1973 when reported and adjusted rates of return moved generally in a similar fashion, and the period since 1973 when reported and adjusted rates of return began diverging.

The importance of adjusting reported rates of return for the hidden costs of inflation is easily seen in the more recent period. Despite a significant fall in the mid-1970s, reported rates of return remained high relative to earlier years and, in the first three quarters of 1979, rose to their highest level since 1963. This suggests that incentives to invest could be higher now than at any time since the early 1960s. Adjusted rates of return, however, tell a significantly different story.

Movements in inflation-adjusted rates of return suggest that the profitability of capital at current costs and prices did not increase nearly as much over the period 1971-1974 as was suggested by the sharp increase in reported rates of return. The subsequent decline reduced profitability in 1977 to the lowest level recorded since 1963.

Real (inflation-adjusted) rates of return, however, recovered significantly in late 1978 and early 1979 and were as high in the first three quarters of 1979 as in earlier periods of strong investment growth. The two seven-year periods within the last two decades in which the highest average growth rates of non-residential investment were recorded were the years 1961-1967 and 1969-1975. Non-residential business investment grew at an average rate of 7.4 per cent per year in the early period and at an average rate of 6.7 per cent per year in the latter period. Rates of return were fairly high in those periods, 14.1 per cent on average during the 1963-1967 period and 13.2 per cent during the 1969-1975 period.⁽¹⁾ During the first three quarters of 1979 inflation-adjusted rates of return are estimated at 13.9 per cent.

Rates of return were subject to many influences during the mid-1970s. These included large fluctuations in rates of capacity utilization, high rates of price and wage increases, fluctuations in the exchange rate and in terms of trade, and relatively rapid changes in the price of energy inputs. For purposes of assessing the likely strength or weakness of incentives to invest over the medium term, it would be useful to determine the relative strength of these different factors and to evaluate the extent to which their impact on rates of return is likely to be temporary or permanent. These factors, however, have had different effects on rates of return in the various sectors of the economy. These effects are examined in Section 5 below.

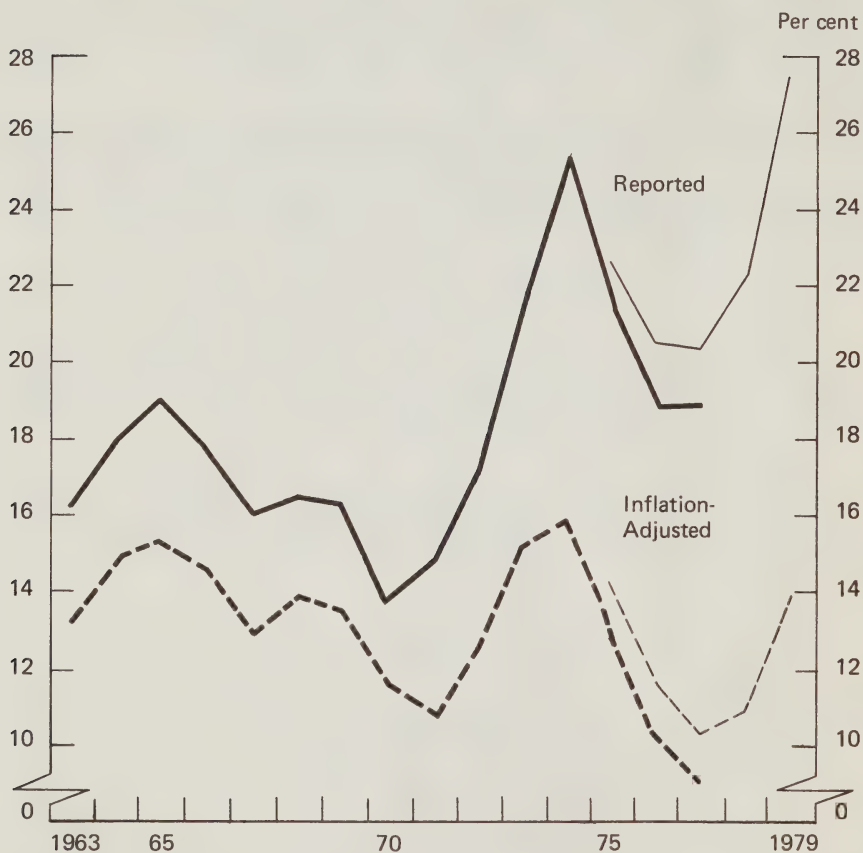
4.2 After-Tax Rates of Return and Effective Tax Rates

From the point of view of corporate managers and owners, the rates of return relevant to the evaluation of the profitability of investment should be after-tax rather than before-tax rates of return. After-tax

⁽¹⁾ Data were not available to calculate rates of return prior to 1963. The period 1961-1967 was chosen in order to be comparable with the seven-year period 1969-1975 and the projection period 1979-1985. For the shorter period 1963-1967, non-residential investment grew on average by 10.6 per cent.

Chart 1

Before-Tax Rates of Return on Equity,
Private Non-Financial Corporate Sector, All Industries, Canada, 1963-1979^(1, 2)



(1) 1979 data are seasonally-adjusted data referring to the first three quarters only.

(2) After adjustments to remove foreign assets and related income, eliminate double-counting of intercorporate shareholdings, and count deferred tax liabilities as equity.

Source: Statistics Canada, *Industrial Corporations: Financial Statistics*, Cat. 61-003; and Long Range and Structural Analysis Division, Department of Finance.

rates of return are shown in Chart 2. As would be expected, taxes reduce somewhat the amplitude of swings in profits or rates of return. The broad movements described earlier in the case of before-tax rates of return, however, are still evident.

Following a period of rapid decline starting in the mid-1970s, after-tax rates of return recovered significantly in late 1978 and early 1979. Compared to earlier periods of strong growth in non-residential business investment, 1961-1967 and 1969-1975, when after-tax rates of return averaged, respectively, 9.0 per cent⁽¹⁾ and 8.1 per cent, rates of return recovered to 8.2 per cent in the first three quarters of 1979.

The comparison of inflation-adjusted rates of return before and after taxes is often used to describe the impact of inflation on real effective corporate tax rates. If inflation-adjusted profits differ from reported profits, real effective tax rates differ from nominal tax rates.⁽²⁾ This is a mathematical truism. Since deductions for tax purposes are based on historical costs, deductions may understate true production costs in some cases and overstate them in others. In the case of depreciation charges for the use of fixed capital assets and the cost of maintaining the real value of inventories and working capital balances, estimates of production costs based on historical cost accounting understate true costs of production. Whether this is also true in the case of deductions for tax purposes depends on the tax treatment of these different components of costs. For example, accelerated capital cost allowances could reduce or even eliminate the gap between accounting depreciation and the true cost of using fixed assets. In the case of interest payments on borrowed capital, deductions from income for tax purposes overstate true costs of borrowing and thus lower the real effective tax rate below the nominal tax rate. On balance, the net effect on real effective tax rates depends on the relative strength of these different influences.

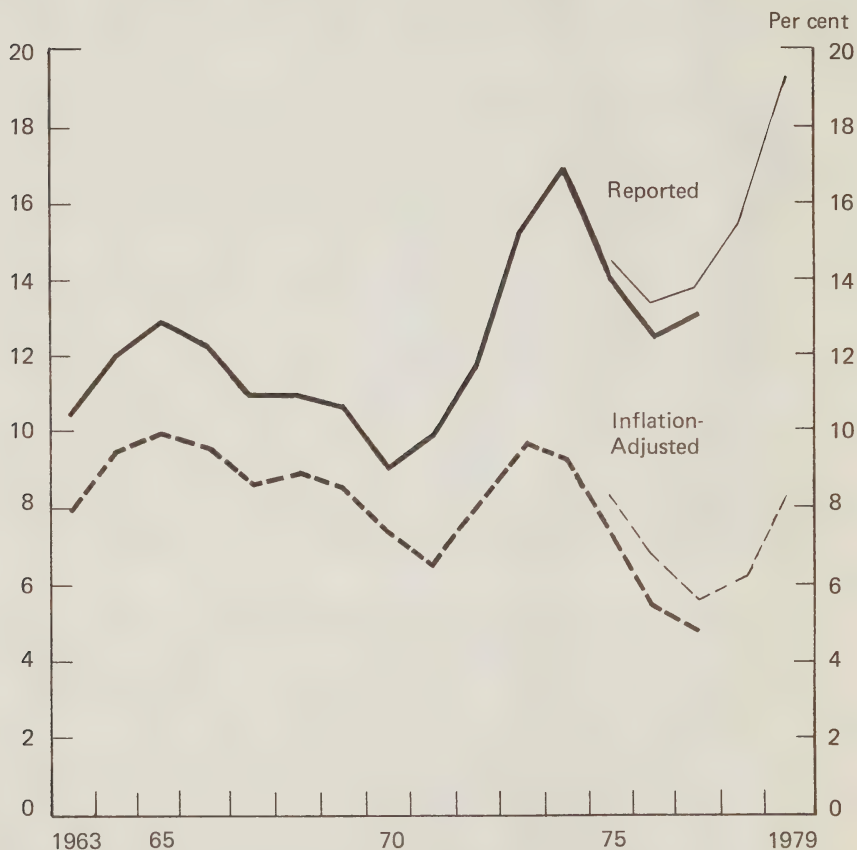
On balance, in the corporate non-financial sector, inflation-adjusted profits are lower than reported profits. As a result, average real effective tax rates exceed average nominal tax rates. This does not necessarily mean, however, that inflation has raised the burden of taxation on corporate income. While there has not been a change, in the case of corporate taxation, comparable to the indexation of the personal income tax, a number of tax reductions were introduced in the 1970s. The 1971 Tax Reform Act introduced a staged reduction in the federal corporate tax rate from 50 to 46 per cent. In 1972, a still lower federal corporate tax rate, together with accelerated capital cost allowances, was introduced for manufacturing and processing companies. In 1975, a federal investment tax credit was introduced. Finally in 1977, a deduction equal to 3 per cent of the value of opening inventory was introduced to provide a partial offset to the effects of inflation.

⁽¹⁾ 1963-1967 only; see footnote 1 on p. 13.

⁽²⁾ Nominal tax rates are average tax rates relative to total reported profits and, thus, differ from statutory tax rates which relate to taxable profit.

Chart 2

After-Tax Rates of Return on Equity,
Private Non-Financial Corporate Sector, All Industries, Canada, 1963-1979^(1, 2)



(1) 1979 data are seasonally-adjusted data referring to the first three quarters only.

(2) After adjustments to remove foreign assets and related income, eliminate double-counting of intercorporate shareholdings, and count deferred tax liabilities as equity.

Source: Statistics Canada, *Industrial Corporations: Financial Statistics*, Cat. 61-003; and Long Range and Structural Analysis Division, Department of Finance.

Despite these changes in corporate taxation, average real effective tax rates have increased in the 1970s. This may reflect, in part, the fact that changes in corporate taxation have not been sufficient to offset the effects of higher rates of inflation on taxable income.⁽¹⁾ However, as can be seen in Table 2, the size of the increase differs markedly between sectors, with a particularly noticeable increase in the energy sector and a smaller increase in the manufacturing sector. In the case of the energy sector, the increase in real effective tax rates reflects, in part at least, changes in 1974-1975 in the taxation of energy industry income, in particular the removal of royalty deductibility and the reduction of development deductions.

Despite the increase in average real effective tax rates, the several changes in corporate taxation in the 1970s may have had more effect in offsetting the effects of inflation on the tax rates applying to new investment projects. This is because some of the changes in taxation, in particular, the accelerated capital cost allowances and the federal investment tax credit, were aimed specifically at investments in new capital assets. Chant and McFetridge, for example, concluded that the introduction in 1972 of the accelerated depreciation for new investments in machinery and equipment was more than sufficient to offset the effects of accelerating inflation between 1972 and 1977 in reducing the present value of capital cost allowances and, thus, in raising the user cost of capital.⁽²⁾ The same conclusion holds when the analysis is extended to include 1978 and 1979.

(1) Because of the aggregated nature of the data shown in Table 2, however, this conclusion must be qualified. The average effective tax rate shown in Table 2 is calculated on the basis of aggregate profits net of losses. Taxes, however, are assessed on positive profits and it is possible, during periods in which the proportion of losses to net (pre-tax) profits changes, for the effective tax rate measure to indicate an illusory increase in the tax burden. Consider, for example, an economy with two firms and a tax rate of 50 per cent. In the first period, each firm earns \$150 and pays \$75 in taxes for an average effective tax rate of 50 per cent. If in another period, however, the first firm's income rose to \$300 (and its taxes to \$150) while the second firm suffered a loss of \$100 (and paid no taxes), the average effective tax rate on net income would rise to 75 per cent ($= \$150/\200), showing an illusory increase in the burden of corporate taxation. To determine whether the burden of corporate taxation has been "unintentionally" raised by inflation would require a more detailed study to disentangle the effect of these different influences. One such study concluded that tax reductions, on balance, had not been sufficient to offset the effect of inflation in raising effective tax rates over the period 1971-1975 (see J. Bossons, The Impact of Inflation on Income and Financing of Large Non-Financial Corporations, Supplementary Paper No. 5, Ontario Committee on Inflation Accounting). This study, however, did not take into account all of the gains associated with the fall in the real value of debt and thus overstated the difference between reported and adjusted profits.

(2) J.F. Chant and D.G. McFetridge, The Allocative Effects of Inflation: Interaction Between the Tax System and Anticipated Inflation Rates, Anti-Inflation Board, Ottawa, 1979.

In addition, it should be remembered that, from the point of view of taxation, other adjustments than those described above could have to be made in order to measure inflation-adjusted income.

Table 2

Average Nominal and Real Effective Tax Rates on Corporate Income, Private Non-Financial Corporate Sector, Canada, 1963-1978(1,2)

	All Industries		Manufacturing(3)		Energy(4)	
	Nominal	Real	Nominal	Real	Nominal	Real
	(per cent)					
1963-65	33.8	37.2	37.1	42.6	19.3	20.1
1966-70	33.3	35.6	39.1	44.0	17.7	18.6
1971-75	32.7	39.4	35.4	45.2	24.9	31.7
1976	34.9	43.1	36.6	47.5	30.7	37.9
1977	33.1	45.7	31.6	48.0	29.3	36.8
1978	30.7	44.3	29.6	47.2	24.6	30.5

(1) Deferred taxes and royalties are not included as taxes.

(2) Tax rates for 1976-1978 are based on revised data.

(3) Excludes the petroleum and coal products industry but includes forestry.

(4) Includes the mineral fuels industry (primarily oil and gas wells) and the petroleum and coal products industry (largely refineries). It does not, however, include publicly owned utilities or the energy distribution industry.

Source: Statistics Canada, Industrial Corporations: Financial Statistics, Cat. 61-003, and Long Range and Structural Analysis Division, Department of Finance.

5. RATES OF RETURN IN THE ENERGY AND NON-ENERGY SECTORS

Inflation-adjusted rates of return in the energy, manufacturing and non-energy non-manufacturing(1) sectors are shown in Chart 3. Rates of return in the energy and non-energy-producing sectors of the economy have followed significantly different paths in recent years.

In the energy sector, before-tax rates of return(2) increased significantly in 1974, and have since remained quite high despite the fact that rates of capacity utilization have fallen significantly since 1973-1974, and that new sources of energy are probably more expensive to find and to bring into production now than in earlier years. While a substantial portion of the increased revenues resulting from higher energy prices was appropriated by governments through higher royalties and other taxes, after-tax rates of return in the energy sector have remained relatively high through the period since 1973, compared to earlier years.

In the case of the manufacturing sector, the broad movements described earlier for rates of return for all industries are apparent. In contrast with rates of return for all industries, however, rates of return in the manufacturing sector did not fall much lower in recent years than during the previous cyclical downturn in 1970. After-tax rates of return began to recover strongly in late 1978 and, for the first three quarters of 1979, averaged 7.1 per cent. In 1961-1967 and 1969-1975, the two earlier seven-year periods of strongest investment growth since the early 1960s, after-tax rates of return in the manufacturing sector averaged 8.4 per cent(3) and 7.2 per cent, respectively.

Similar behaviour is also apparent in the case of the non-energy, non-manufacturing sector. Rates of return, both before and after tax, fell sharply between 1974 and 1977 but recovered somewhat in 1978 and 1979. For the first three quarters of 1979, after-tax rates of return averaged 8.1 per cent compared to 10.1 per cent and 9.2 per cent, respectively, in 1963-1967 and 1969-1975.

These movements in rates of return in the manufacturing and other non-energy-producing sectors of the economy reflect several influences. First, rates of return were influenced significantly by the sharp fall

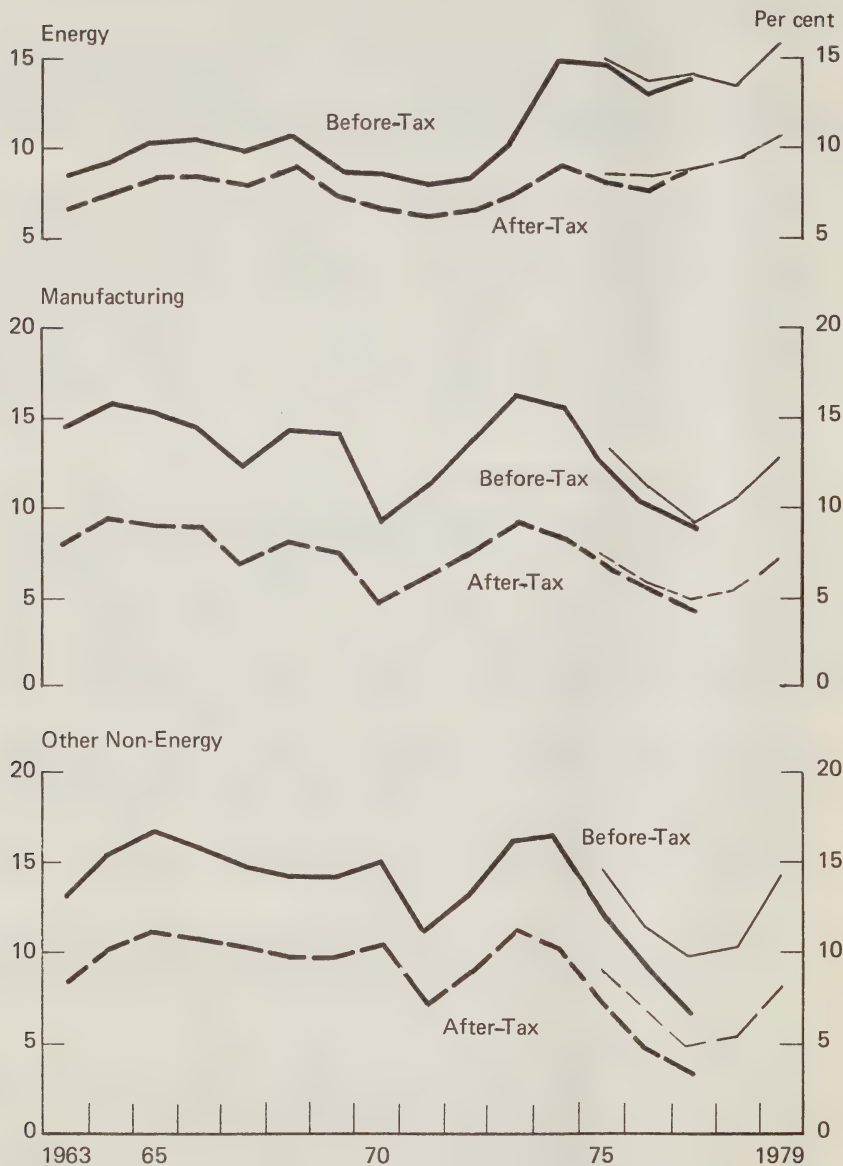
(1) The non-energy non-manufacturing sector includes mining (excluding mineral fuels), trade, commercial services, transportation, storage and communication, and electric, water, and gas utilities.

(2) Before-tax rates of return are defined to be before income tax but after royalties. Royalties are thus treated as a cost of production.

(3) 1963-1967 only; see footnote 1 on p. 13.

Chart 3

Inflation-Adjusted Rates of Return on Equity,
Private Non-Financial Corporate Sector,
Energy, Manufacturing, and Other Non-Energy Industries, Canada, 1963-1979



(1) 1979 data are seasonally-adjusted data referring to the first three quarters only.

Source: Statistics Canada, *Industrial Corporations: Financial Statistics*, Cat. 61-003; and Long Range and Structural Analysis Division, Department of Finance.

in rates of capacity utilization after 1974.(1) In the manufacturing sector, rates of capacity utilization fell sharply from 93 per cent in early 1974 to only 82 per cent, on average, during the period 1975-1977. The combined effects of the resulting slow growth in labour productivity and of the acceleration in wage and salary increases that took place concurrently led to large increases in real unit labour costs (defined as unit labour costs deflated by a price index for the output of the industry(2)), and, thus, depressed profits. Subsequently, slower increases in wages than in the prices of manufactures and the strong recovery in capacity utilization rates since early 1978 have combined to produce a sharp fall in real unit labour costs in the manufacturing sector. The higher prices of manufactures and capacity utilization rates reflect, in part at least, the effects of the depreciation of the dollar. Real unit labour costs in the non-manufacturing non-energy sector followed a roughly similar pattern, increasing in the mid-1970s and falling more recently, although fluctuations were much less marked than in the case of the manufacturing sector.

Second, in the case of the manufacturing sector, the relatively high rates of inflation of recent years also seem to have exerted a strong downward influence on rates of return. No evidence could be found, however, of a similar impact of high rates of inflation in the non-manufacturing sector.

The effect of inflation on the profitability of capital depends on whether firms adjust their prices to fully offset the effects of inflation on costs of production. In turn, this will depend on whether firms can raise their prices without losing market share and/or on whether all increases in costs are perceived correctly. Unless costs are perceived correctly, prices will not be raised sufficiently both to meet the cost of replacing used-up equipment and inventories and to maintain the desired mark-up over other costs.(3) On the other hand, to the extent that some costs adjust to higher prices with a lag, profits could rise in periods of inflation.

This apparent differential effect of inflation on rates of return in the manufacturing and non-manufacturing sectors probably reflects, in part at least, the fact that borrowed capital finances a relatively

(1) This discussion of the impact of different influences on rates of return is based on results obtained from econometric analysis of before-tax rates of return over the period 1963-1978. The estimated equations for the energy, manufacturing, and non-energy non-manufacturing sectors are shown in Appendix I.

(2) The industry selling price index for manufactures (excluding petroleum and coal products) in the case of the manufacturing industry, and, for non-manufacturing industries, the implicit GDP deflator for these industries.

(3) The Sandilands (U.K.) Committee on Inflation Accounting, for example, concluded that few companies have taken account of the inadequacies of historic cost depreciation for management purposes and that this may have led to "defective pricing policies". Report of the Inflation Accounting Committee, Chairman F.E.P. Sandilands, London, 1975, p. 83.

larger share of assets in the non-manufacturing sector.(1) Consequently, a larger portion of the higher costs of production associated with inflation may have been offset, in the case of the non-manufacturing sector, by transfers from lenders in the form of declines in the value of debt claims as inflation expectations were adjusted to higher rates of inflation only with a lag. The apparent differential effect of inflation on rates of return may also reflect the possibility that stronger competition in the manufacturing sector has prevented domestic producers from adjusting their prices fully for the higher costs of production resulting from inflation.

Third, in the case of both the manufacturing and other non-energy-producing sectors, the effects of lower rates of capacity utilization and higher rates of inflation on rates of return were offset in part by the improvement in external terms of trade since 1973. Such gains in terms of trade increase real income and may be reflected in either higher real wages or higher rates of return, or both.

Fourth, while domestic energy prices did not rise as much or as quickly as world energy prices, domestic terms of trade between energy and non-energy products have changed significantly since 1974.(2) The change in both external and domestic terms of trade between energy and non-energy products could have significant effects on rates of return.

In the longer run, the impact of higher energy prices on rates of return, both in the aggregate and in different sectors of the economy, depends very much on a number of the economy's characteristics.(3) These characteristics include, in particular, the relative factor intensities in the energy and non-energy sectors of the economy, the supply cost of marginal energy production, the ease with which labour and capital can be substituted for energy in the production process, and the relative mobility of factors of production between different sectors and regions of the economy.

In the energy-producing sector, provided that the higher price of energy is not fully offset by higher production costs, the higher relative price of energy will increase real income. This income gain will be shared by both labour and capital in the form of higher wages and rates of return. The higher rate of return should result in capital inflows into the energy sector and an acceleration of investment spending

(1) In 1978, the ratio of debt to total assets is estimated at 0.44 in the manufacturing sector compared to 0.52 in the non-energy non-manufacturing sector.

(2) For example, the industry selling price index (ISPI) for petroleum and coal products rose by 135 per cent between 1973 and 1978 compared to 61 per cent for non-energy products, implying a change of about 46 per cent in the relative price of energy and non-energy products.

(3) A detailed theoretical discussion of the long-run effects of higher energy prices can be found in The Effects of Higher Energy Prices on Long-Run Growth, Department of Finance, Ottawa, 1978.

until the capital-labour ratio or the level of activity have expanded sufficiently to lower, in the longer run, the aggregate rate of return on capital back to the level of the cost of capital.(1)

In the non-energy-producing sector of the economy, however, the effect of higher energy prices is to reduce real income. This income loss will be shared by both labour and capital. If, as some recent empirical studies(2) suggest, labour is a much better substitute than capital for energy, or if capital and energy are complementary, the higher price of energy will initially reduce the rate of return on capital in the non-energy sector. Since capital markets are highly integrated, this initial reduction in the rate of return on capital used in non-energy production will reduce incentives for capital expansion until the capital-labour ratio or the level of activity in the non-energy sector has fallen sufficiently to raise the rate of return in the longer term back up to the cost of capital.

The adjustments to higher energy prices discussed above deal only with the longer term effects of higher energy prices on rates of return and capital-labour ratios. They do not take into account possible indirect shorter term cyclical effects on rates of return resulting from changes in energy prices. Unless compensatory private or public sector behaviour offsets the impact of higher energy prices on inflation and output, the higher rates of inflation and lower rates of capacity utilization

(1) This assumes that the change in energy prices has no effect on the cost of capital in the long run. With substitution between factors of production in the world non-energy sector, however, higher energy prices could reduce world income and saving and, thus, could put upward pressure on the world cost of capital. This effect could be strengthened if efforts by energy importers to increase their domestic production of energy raised the demand for capital. On the other hand, these upward pressures on the world cost of capital could be offset, if net energy exporters have a higher propensity to save than energy consumers or if the increased demand for capital in the energy sector is not sufficient to absorb the capital released from non-energy production. The direction of the effect of higher energy prices on the world and domestic cost of capital is thus unclear.

(2) See, in particular, "The Demand for Energy in Canadian Manufacturing: Prologue to an Energy Policy", M. Denny et. al., Canadian Journal of Economics, May 1978. This study finds that labour is highly substitutable for both capital and energy while the use of capital and energy are complementary. This finding of complementarity between capital and energy in Canadian manufacturing is consistent with the results of studies by M.A. Fuss, "The Demand for Energy in Canadian Manufacturing: An Example of the Estimation of Production Structures with Many Inputs", Journal of Econometrics, Jan. 1977; and by E.R. Berndt and E.W. Wood, "Engineering and Econometric Interpretations of Energy-Capital Complementarity", American Economic Review, June 1979. This latter paper also reviews in some detail the contradictory findings of different studies on the issue of complementarity or substitutability of capital and energy. The conclusion of the paper is that "there appears to be a substantial and growing body of econometric evidence supporting the notion of (energy-capital) complementarity".

resulting from a large increase in energy prices will tend to depress rates of return in the short and medium term. These macroeconomic effects of higher energy prices will further reduce rates of return in the non-energy sector and will hold back increases in rates of return in the energy sector.

The estimated impact of the higher relative price of energy on before-tax rates of return in the energy and non-energy-producing sectors of the economy is shown in Chart 4. For each sector, actual rates of return and estimated rates of return, assuming constant 1973 terms of trade between energy and non-energy products, are shown.(1) The difference between the solid and dotted lines represents the estimated impact of higher relative energy prices on before-tax inflation-adjusted rates of return in each sector. These estimates do not take into account the indirect effects of higher energy prices on rates of return through their effects on inflation and rates of capacity utilization. Rather they indicate what the rate of return might have been given the same level of aggregate inflation and slower growth but with no change in the relative price of energy after 1973.

Since domestic prices have reflected increases in oil prices on world markets only with a lag, domestic terms of trade between energy and non-energy products did not change significantly until after 1975. This is illustrated by the relatively small size of the difference between actual and estimated rates of return in 1974 and 1975.

After 1975, however, the relatively rapid increase of domestic energy prices exerted a significant depressive influence on average rates of return in the manufacturing and other non-energy-producing sectors of the economy. It is estimated that, between 1973 and 1978, sectoral terms of trade relative to energy deteriorated by 55 per cent for the manufacturing sector and by 66 per cent for the non-energy non-manufacturing sector.(2) In the absence of these changes in relative prices, and assuming that everything else had remained the same, average rates of return in 1978 would have been about 50 per cent higher in the manufacturing sector and about twice as high in the non-energy non-manufacturing sector.

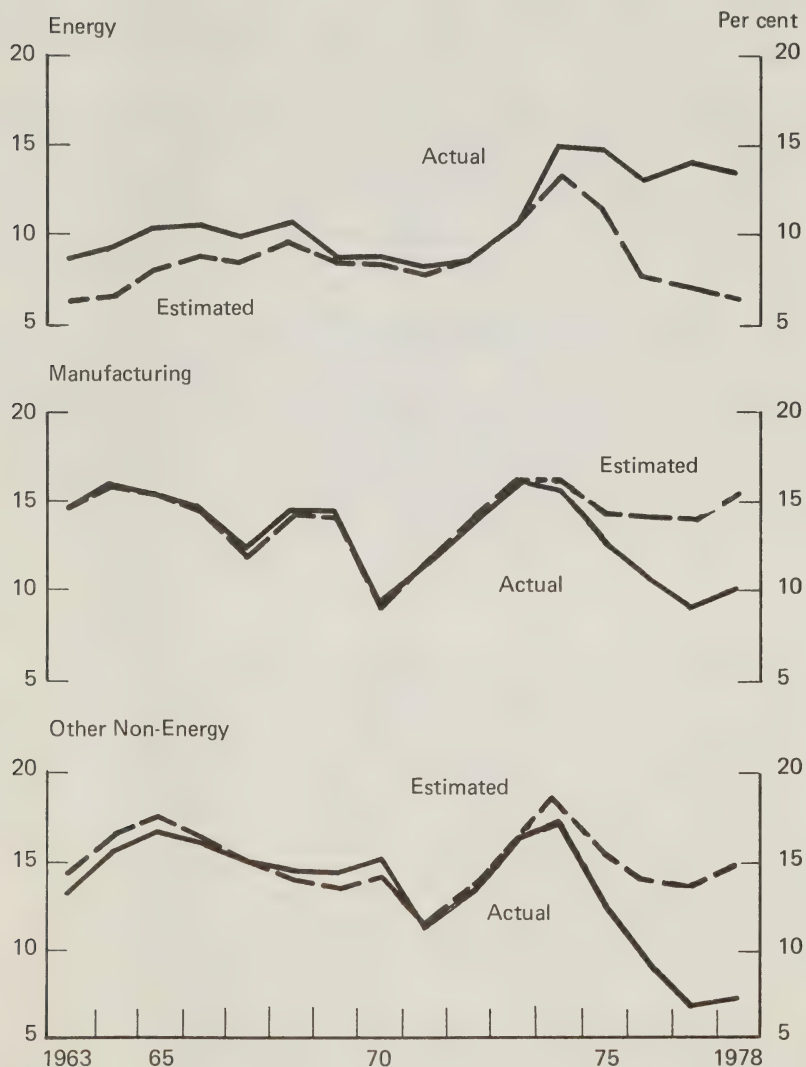
It should be noted, however, that it would not likely have been possible to insulate fully real rates of return in the non-energy-producing sectors of the economy against the effect of higher world prices for energy, by preventing domestic energy prices from rising. Since Canada is a net oil importer, lower domestic energy prices could have been maintained only at the cost of larger federal subsidy payments on imported oil. Unless other government expenditures had been corres-

(1) For each industry, estimated rates of return, assuming constant 1973 terms of trade between energy and non-energy products, were calculated by removing the effect of changes in the relative price of energy, estimated through simulation of the equations shown in Appendix I.

(2) This change in sectoral terms of trade is measured as the difference between the increase in the unit cost of energy (total expenditures on energy divided by the volume of energy consumption) in each sector and the increase in sectoral output prices.

Chart 4

Simulated Effect of Changes in Energy Prices on Before-Tax Rates of Return, Energy, Manufacturing, and Other Non-Energy Industries, Canada, 1963 – 1978



(1) Estimated rates of return are rates of return simulated on the basis of an assumption of constant 1973 terms of trade between energy and non-energy products. The simulating equations are shown in Appendix I.

Source: Long Range and Structural Analysis Division, Department of Finance.

pondingly reduced or taxes had been raised, the larger government deficit and the resulting higher rate of inflation would have exerted downward pressures on rates of return. Lower domestic energy prices would also have reduced incentives for energy conservation and thus, by keeping oil imports larger, would have reduced the terms of trade gains accruing to the economy as a whole as a result of higher world energy prices. These smaller gains would eventually have to be reflected in lower real wages or lower rates of return or both.

The impact of higher energy prices on investment expenditures in the non-energy sector, however, is not clear. Machines, once built, must generally be operated with fixed amounts of energy. Reflecting this limited possibility for substituting capital for energy in the short run, higher energy prices initially reduce rates of return in the non-energy sector. Unless capital and energy are better substitutes in the longer run, this initial reduction in the rate of return on capital used in non-energy production will reduce incentives for capital expansion until the capital-labour ratio in the non-energy sector has fallen sufficiently to raise the rate of return in the longer term back up to the cost of capital. To the extent, however, that it is possible to redesign new machines to be operated in a less energy-intensive manner, gross investment expenditures could increase, reflecting the need to replace energy-intensive equipment. The strength of such investment spending, however, could be undermined by the availability of sufficient funds as lower average rates of return reflect a reduced availability of funds from internal sources.

6. OTHER FINANCIAL INDICATORS

As emphasized above, average rates of return on equity provide only partial indications of the strength of incentives to invest. Changes in the strength or weakness of incentives to invest may also result from changes in the cost of capital for investment. In the absence of firm knowledge of the behaviour of the supply cost of capital, it is useful to examine other financial indicators which, directly or indirectly, may provide additional information on the evolution of incentives to invest.

Three such indicators are examined in this section: the debt/equity ratio, the earnings/price ratio and the ratio of market to replacement value. The debt/equity, or leverage, ratio is often seen as an indicator of the risks of insolvency. Higher leverage ratios, to the extent that they are associated with higher risks of insolvency, could result in higher costs of capital. In the case of the earnings/price ratio, to the extent that current earnings can be used as a proxy for expected earnings, the ratio of earnings to stock prices is a useful indicator of the cost of equity capital. Finally, the ratio of market to replacement value is frequently used as an indicator of the relative behaviour of rates of return and the cost of capital.

6.1 The Debt/Equity Ratio

The use of debt finance by firms permits leverage of earnings to equity holders. This increased leverage, however, increases the share of earnings that must be used to service the debt and raises the risk that, at times of cyclically low sales, the firm may be unable to meet its contractual obligations. Thus, although its determinants are not well understood, it is widely held that there is some desirable combination of financial instruments with which to finance a firm's activities. Given that there are costs to default or bankruptcy, as leverage increases, lenders could raise the cost of loans to compensate themselves for the increased risk of default. This would raise the cost to the firm of borrowed capital. In addition, to the extent that a greater reliance on debt finance increases the systematic risk on a firm's common stock, increases in leverage may lower stock prices and, thus, raise the cost to the firm of equity capital.

A favourite indicator used by financial analysts to evaluate the solvency of firms is the debt/equity ratio. Other things equal, increases in the debt/equity ratio above historical averages could result in a reassessment by investors of the risk of insolvency and raise the cost at which a firm can borrow funds. In this context, the increase in corporate debt/equity ratios in the 1970s is often used to suggest that corporate financial structures may be weakening. While corporate holdings of financial assets, especially accounts receivable and interest-bearing assets, have also increased significantly since

the early 1960s, their rate of growth has remained well below that of liabilities, resulting in higher "net" debt/equity ratios.

Debt/equity ratios constructed on the basis of traditional accounting entries can be misleading. This is because, in an inflationary environment, the current value of a firm's fixed assets exceeds the unamortized historical value shown in the firm's balance sheet. This appreciated current value of a firm's fixed assets reflects the discounted or present value of future earnings and should thus be included as part of the owners' equity. Reported equity also understates true equity as a result of the accounting treatment of deferred tax liabilities. Accumulated deferred taxes, reported as liabilities under current accounting practice, are more properly viewed as equity. This is because, for firms that are going concerns, deferred taxes are unlikely ever to be paid. For these reasons, traditional accounting entries overstate liabilities and understate equity.(1)

Reported and adjusted debt/equity ratios(2) are shown in Table 3. In order to illustrate the importance of both the adjustment for deferred tax liabilities and the adjustment for the appreciation of net fixed assets, debt/equity ratios are shown after adjustment for deferred tax liabilities only and after adjustment both for deferred tax liabilities and for the appreciation of net fixed assets. Each adjustment accounts for about half of the difference between reported debt/equity ratios and fully adjusted debt/equity ratios.

The revision of the sample of corporations based on the 1974 corporate population resulted in a significant revision of the debt/equity ratio. The new corporations included in the sample in the later period appear to have relied relatively more on debt financing. In the case of the adjusted debt/equity ratio, this revision makes it difficult to determine whether or not there is a trend. It is clear, however, that the upward trend in reported debt/equity ratios significantly overestimates the increase over time in the reliance of the corporate sector on debt finance. The adjusted debt/equity ratio suggests that, after rising gradually through the 1960s, the relative share of borrowed funds in corporate financial structures either remained relatively stable or declined in the 1970s.

(1) As was explained earlier, aggregate balance sheets constructed through summation of individual firms' balance sheets overstate both liabilities (for minority shareholders' interest) and equity (for intercorporate holdings of shares). In order to reduce discrepancies from traditional debt/equity ratios, no adjustment was made for these items in the calculation of the debt/equity ratios shown in this section. Removing these items from reported liabilities and equity would affect the levels of reported and adjusted debt/equity ratios but would affect neither their trend nor their fluctuations.

(2) The debt/equity ratio is debt divided by equity. There are, however, as many ratios as there are analysts who compute it. In particular, debt can be defined to include all liabilities, all but current liabilities, or only long-term, interest-bearing debt. The definition of debt adopted here covers all liabilities.

Table 3

Debt/Equity Ratios, Private Non-Financial Corporate
Sector, All Industries, Canada, 1963-1978

	Reported	Adjusted for Deferred Tax Liabilities	Adjusted for Deferred Tax Liabilities and Capital Appreciation
1963	0.92	0.86	0.79
1964	0.93	0.86	0.78
1965	0.96	0.88	0.79
1966	1.01	0.91	0.81
1967	1.04	0.93	0.83
1968	1.06	0.94	0.85
1969	1.07	0.93	0.85
1970	1.07	0.92	0.82
1971	1.06	0.91	0.79
1972	1.07	0.91	0.78
1973	1.08	0.92	0.78
1974	1.14	0.95	0.76
1975	1.19	0.97	0.73
1976	1.19	0.96	0.70
1977	1.18	0.95	0.69
Revised Data			
1975	1.43	1.18	0.88
1976	1.42	1.16	0.84
1977	1.38	1.13	0.81
1978	1.38	1.12	0.81

Source: Statistics Canada, Industrial Corporations: Financial Statistics, Cat. 61-003, and Long Range and Structural Analysis Division, Department of Finance.

The interpretation of movements in the debt/equity ratio is further complicated in recent years by the rapid expansion of issues of term-preferred shares. Term-preferred shares are classified as equity since their return can legally be called a dividend. Their "redeemable, retractable, floating rate" characteristics, however, make them akin to debt rather than to equity. The tax-free status for dividends paid on such shares made them an increasingly popular method of financing in 1977-1978 and resulted in an artificial reduction in debt/equity ratios. The withdrawal in November 1978 of tax-free status for the dividends paid on such shares of less than 10 years maturity made them a less attractive investment and new issues have since dropped sharply.

While an important portion of the fall in the debt/equity ratio in 1977-1978 probably reflects the impact of issues of term-preferred shares, the available information suggests that the relative share of debt in corporate financial structures is not significantly higher, and

could even be lower, now than in the late 1960s. The adjusted debt/equity ratio in 1976, based on the revised sample of corporations, is estimated at 0.84 compared to 0.85 in 1968 and 1969. This is in sharp contrast with inferences drawn from flow of funds data which show that an increasing share of new funds raised in recent years have been raised in debt rather than in equity markets. In an inflationary environment, however, while the value of invested equity appreciates, the real value of outstanding liabilities falls. In order to maintain the firm's financial structure unchanged, new debt must be raised as the value of the old one is eroded. The fact that more funds are raised in debt rather than in equity markets now than in the 1960s thus does not mean that leverage has been rising.

In conclusion, there is no evidence of a significant increase in corporate leverage. Provided that financial markets make adjustments such as those described above, the cost at which investment funds are supplied should not have been raised to reflect increased risks of financing as a result of higher leverage ratios.

6.2 The Earnings/Price Ratio

The earnings/price ratio is defined as the ratio of earnings after taxes (dividends plus retained earnings) to the market value of shares. These earnings can be either distributed to shareholders or retained by the firm for expansion. Both the distributed and retained portions of earnings, however, are part of the stockholders' return. Provided that the firm does not invest its retained earnings in unprofitable ventures, retained earnings result in an appreciation of the firm's shares and are thus part of the stockholders' return in the form of capital gains.

By analogy with the measurement of the cost of borrowed capital (equal to the rate of interest), the cost of equity capital to a firm is defined as the ratio of annual payments necessary to induce participants in the stock market to invest their funds in equity relative to the value of invested capital. This is equal to the ratio of expected earnings, or expected annual returns to investors, to the market value of equity. Unless current and expected earnings differ significantly, the earnings/price ratio calculated on the basis of actual earnings and stock prices may thus provide indications of movements in the cost of equity capital.

The Toronto Stock Exchange (TSE) earnings/price ratio is shown in Chart 5. As can be seen from the chart, the earnings/price ratio rose significantly in 1974 and has since remained, on average, 93 per cent higher than its average over the period 1963-1973. The higher earnings/price ratio could reflect the fact that investors now require a higher rate of return on their funds. This would raise the cost of capital on the equity component of investment funds. Alternatively, the higher earnings/price ratio could reflect a belief on the part of market investors that reported earnings significantly overestimate future earnings possibilities. Provided that these expectations are justified, the higher earnings/price ratio would not imply that the cost of capital has risen but would simply reflect this discrepancy between current and expected earnings.

The possible influences of these different factors on the earnings/price ratio and on the cost of capital are not easily separated. The rapid rise in the price of energy since 1973 has significantly changed the configuration of rates of return in the energy and non-energy sectors of the economy. Higher rates of return in the energy sector may have raised the demand for capital for exploration and resource development, thus resulting in higher costs of capital for the economy as a whole. In the case of the non-energy sector, to the extent that market investors believe that the impact of higher energy prices has not yet been fully reflected in earnings, current earnings could be seen as overestimates of future sustainable earnings.

It would seem unlikely, however, that these two factors could have accounted for a significant portion of the increase in the earnings/price ratio in 1974. First, inflows of foreign capital would have been expected to reduce significantly the effect on the cost of funds of the increased demand for capital in the energy sector. Second, with low rates of capacity utilization in the non-energy sector throughout most of the period since 1974, it seems unlikely that market investors could have considered that current earnings significantly overestimate long-term sustainable earnings.

Fluctuations in the earnings/price ratio may also have reflected, in part at least, the several changes in the taxation of corporate and investment income introduced during the 1970s. These changes in taxation, however, do not seem sufficient to account for more than a relatively small part of the large increase in the earnings/price ratio since the early 1970s. For example, even though the introduction of the capital gains tax in 1971 raised the effective taxation of investment income, the net effect of the 1971 tax reform package, taking into account the reduction in top marginal tax rates and the modification of the dividend tax credit, is unlikely to have reduced after-tax income from investment by more than 10-20 per cent on average. In contrast, the earnings/price ratio doubled in 1973-1974. Most other changes in the taxation of corporate and investment income during the 1970s should have lowered rather than raised the earnings/price ratio.

An alternative explanation, which has been suggested recently for the United States, is that stock market participants' perceptions of corporate profitability have been distorted by the effects of inflation on corporate earnings.⁽¹⁾ The argument, which seems to explain fairly well the behaviour of stock market values in the United States in the 1970s, is that while it is widely understood that reported earnings should be adjusted for the inflation-related costs of maintaining inventories and of replacing depreciable assets, no such adjustment has been made by financial markets for the fall in the real value of corporate liabilities. Market investors may thus have over-corrected reported profits and underestimated true corporate profits. This would have resulted in an undervaluation of stock prices and a corresponding increase in the cost of equity capital.

(1) Franco Modigliani and Richard A. Cohn, "Inflation, Rational Valuation and the Market", Financial Analyst Journal, March/April 1979.

Indirect evidence of a similar phenomenon is available for Canada. Chart 5 shows both reported and inflation-adjusted measures of the TSE earnings/price ratio. Two inflation-adjusted earnings/price ratios are shown. The lower series is an estimate of the earnings/price ratio after the adjustment of earnings for the hidden inflation costs of maintaining inventories and of replacing depreciable assets. The higher estimate of the inflation-adjusted earnings/price ratio reflects adjustments to reported earnings both for the costs of maintaining physical assets and for the gains to the corporate sector resulting from the fall in the real value of nominal liabilities.(1)

To the extent that the market uses current earnings as a proxy for expected earnings, the earnings/price ratio should remain fairly stable unless the cost of capital fluctuates significantly. The relatively small fluctuations of the reported and adjusted earnings/price ratios over the period 1963-1973 suggest that the cost of equity capital remained fairly stable during that period.(2) Of particular interest from the point of view of determining whether the cost of capital may have changed after 1973 is the fact that, in contrast with the reported earnings/price ratio, the earnings/price ratio adjusted for the effects of inflation on the costs of maintaining physical assets remained fairly stable throughout the period. This suggests that the investment community did not raise its required rate of return on equity capital in the more recent period but stopped using reported earnings as a proxy for long-term sustainable earnings and, instead, based its evaluation of long-term sustainable earnings on reported earnings reduced for the higher cost, in an inflationary environment, of maintaining inventories and using up fixed assets.

As was mentioned earlier, however, unless the gains to the corporate sector (as a net debtor) resulting from the fall in the real value of its indebtedness are taken into account, actual earnings are understated. To the extent that the market failed to take these gains into account, this resulted in an undervaluation of true corporate earnings and of corporate shares and, thus, an increase in the cost of capital. This is reflected in the increase, in 1974, of the earnings/price ratio including the adjustment for the fall in the real value of liabilities.

While not conclusive, the evidence suggests that the cost of equity capital rose significantly in 1974-1975. As has been suggested in the case of the United States, this could have been the result of a failure by market investors to offset downward adjustments to reported profits

(1) These estimates were obtained by scaling the TSE earnings/price ratio for the ratio of adjusted to reported profits for the private non-financial corporate sector. The rationale for these adjustments was described in Section 3 above.

(2) Estimates of the supply price of equity capital prepared by J. Helliwell, G. Sparks and J. Frisch confirm that the cost of equity capital fluctuated relatively little over the period 1963-1970. See J. Helliwell et. al., "The Supply Price of Capital in Macroeconomic Models" in Econometric Studies of Macro and Monetary Relations, ed. A.A. Powell and R.A. Williams, North Holland, Amsterdam, 1972, pp. 261-283.

Chart 5

Earnings/Price Ratio, Toronto Stock Exchange
300 Composite, All Industries, Canada, 1963-1979.



(1) 1979 data are seasonally-adjusted data referring to the first three quarters only.

Source: Toronto Stock Exchange, and Long Range and Structural Analysis Division,
Department of Finance.

for the costs of replacing inventories and fixed assets against the gains associated with the decline in the real value of liabilities.(1) The increase in the cost of equity capital, however, was significantly less than is suggested by the rise in the reported earnings/price ratio. This is because, reflecting the acceleration of inflation in the mid-1970s, reported earnings have significantly overstated actual (inflation-adjusted) earnings. Moreover, as can be seen from Chart 5, the fully-adjusted earnings/price ratio has been falling back toward its historical level since 1974, suggesting that the degree of under-valuation of shares, and thus the cost of equity capital, may have declined after first increasing in 1974-1975.

6.3 The Ratio of Market to Replacement Value

The ratio of market to replacement value is a ratio between two different valuations of the same assets.(2) In the numerator, market value reflects the valuation by financial markets of the earnings potential of corporate assets. In the denominator, replacement or reproduction value reflects the acquisition price of productive assets.

In equilibrium, and leaving aside market imperfections such as imperfect competition and/or knowledge, market and replacement values should be equal. In practice, however, the ratio of market to replacement value can be expected to differ from unity reflecting, for example, technological changes or shifts in investor sentiment. Such fluctuations in the ratio of market to replacement value are frequently used as an indicator of the strength or weakness of incentives to invest.

If assets are valued in the market significantly above their replacement cost, and thus the ratio of market to replacement value is significantly above unity, there should be an incentive for corporations to invest in new equipment, thereby creating capital gains for their stockholders. Stated differently, a high valuation of existing assets should provide strong incentives for investing in such assets. Conversely, if assets are valued below their replacement cost, corporations which sell securities to finance investment in new capital goods would be creating capital losses for their stockholders. Values above unity of the ratio of market to replacement value should thus stimulate investment, in excess of replacement and normal growth, while values of the ratio below one should discourage investment.

The link between movements in the ratio of market to replacement value and the strength or weakness of incentives to invest can also be restated in terms of the relationship between the rate of return and the cost of

(1) Modigliani and Cohn, op. cit., concluded that market investors in the United States over-corrected reported profits and raised the required rate of return on equity investment. The evidence presented in this section, however, suggests that only the former factor may have been present in Canada.

(2) This ratio is also known as the "q" ratio in the technical economic literature. See J. Tobin and W. Brainard, "Assets Markets and the Cost of Capital", in Economic Progress, Private Values and Public Policy: Essays in Honor of William Fellner, B. Belassa and R. Nelson editors, North Holland, Amsterdam, 1977.

capital. Since the expected rate of return is the ratio of expected earnings to the current (or replacement) value of productive assets, while the cost of capital is the ratio of expected earnings to the value of invested financial capital (i.e., the financial valuation of companies), provided that firms and investors have the same earnings expectations, the ratio of market to replacement value can be shown to be equivalent to the ratio of the rate of return on capital to the cost of investment funds.(1) Values of the ratio above unity imply that the rate of return exceeds the cost of capital and should thus stimulate investment. Conversely, values of the ratio below one imply that the rate of return is lower than the cost of capital and should thus discourage investment.

Estimates of the ratio of market to replacement value for the Canadian non-financial corporate sector are shown in Chart 6.(2) As is suggested by theory, movements in the ratio of market to replacement value correspond fairly closely with fluctuations in the strength of investment spending. Since the early 1960s three periods of strong growth in the share of business investment(3) relative to GNP can be identified: 1964-1966, 1973-1974, and 1979. As can be seen from Chart 6, all three periods either were part of or were immediately preceded by periods of relatively high ratios of market to replacement value.

Fluctuations in the ratio of market to replacement value during the 1970s provide indications of changes in the strength or weakness of incentives to invest similar to those inferred earlier from movements

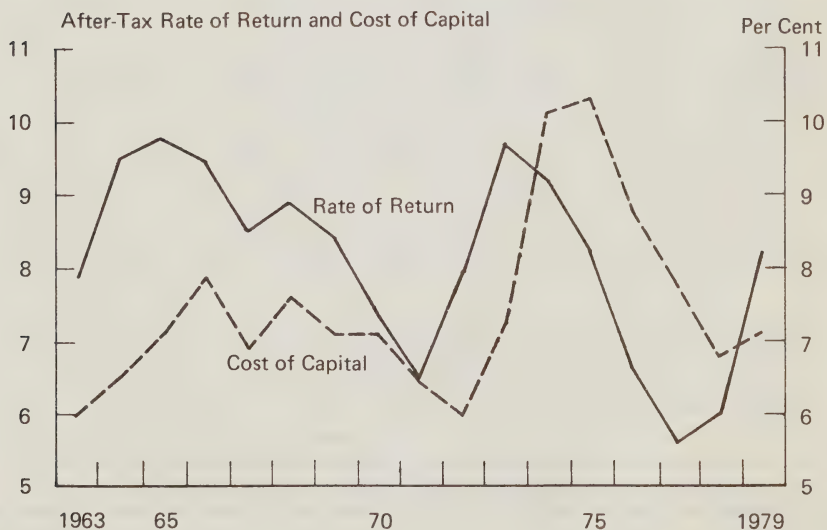
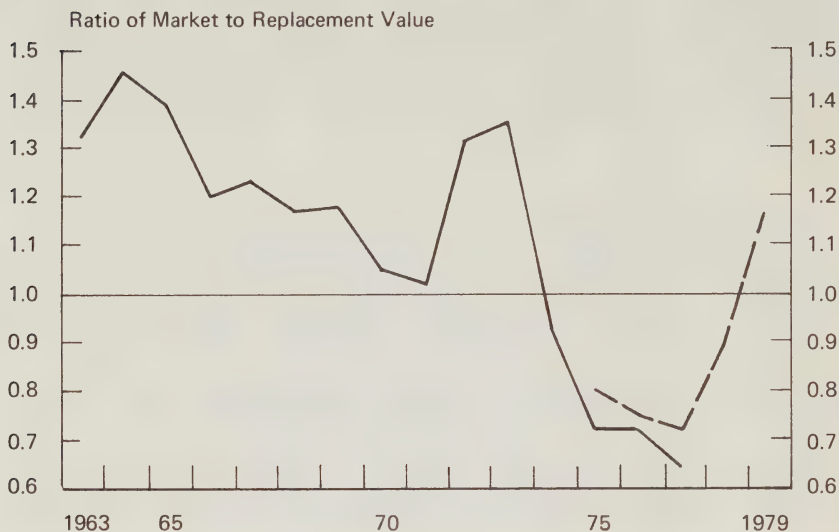
(1) From the foregoing, it should be apparent that what matters is the ratio of market to replacement value at the margin (i.e., the ratio of the increment of market valuation to the cost of the associated investment) rather than the average ratio of market to replacement value. Differences between the marginal and average ratios of market to replacement value may arise for reasons similar to those that could lead to differences between the marginal and average rates of return (see Section 2 above). However, as in the case of the rate of return, since the marginal ratio of market to replacement value is not observable, empirical assessments of the strength or weakness of incentives to invest must be based on movements in the average ratio.

(2) The ratio of market to replacement value is generally calculated in relation to the value of total productive assets, whether these are financed by debt or equity. In this case, the numerator includes the market value of both debt and equity. In contrast, our estimate pertains only to equity and is calculated as the ratio of the market value of common and preferred shares to the current or replacement value of equity (i.e., total assets at replacement cost less liabilities at book value). While the more comprehensive estimate is preferable, no estimate of the current market value of liabilities is available. The Economic Council of Canada also recently reported a similar less comprehensive estimate. The Economic Council's estimate pertained to common stock only. See Economic Council of Canada, Sixteenth Annual Review, Two Cheers for the Eighties, Ottawa, 1979, p. 35. The methodology used in the construction of the ratio of market to replacement value and the data sources are explained in more detail in the Appendix.

(3) Business fixed and non-farm inventory investment.

Chart 6

Ratio of Market to Replacement Value, Inflation-Adjusted After-Tax Rates of Return on Equity, and Cost of Capital, Private Non-Financial Corporate Sector, All Industries, Canada, 1963-1979.



(1) 1979 data are seasonally adjusted data referring to the first three quarters only.

(2) For rates of return and the cost of capital, only estimates based on the revised corporate data are shown for the period 1975-1979.

Source: Long Range and Structural Analysis Division, Department of Finance.

in average rates of return: a strong rise in the profitability of investment in the first half of the 1970s, followed by a sharp decline and depressed incentives to invest until 1977, and a strong recovery in 1978-1979. During the first three quarters of 1979, the ratio of market to replacement value is estimated at 1.16 compared to 1.04 on average over the period 1963-1978. The ratio of market to replacement value had averaged 1.32(1) and 1.09, respectively, over the periods 1961-1967 and 1969-1975, the two seven-year periods within the last two decades in which the highest average growth rates of non-residential investment were recorded.

The ratio of market to replacement value can also be used, in combination with our independent estimate of the rate of return, to derive an implicit estimate of the cost of capital.(2) This estimate is shown in the bottom panel of Chart 6 along with the estimated real after-tax rate of return on equity. Movements in this estimate of the real cost of capital are fairly similar to the movements in the inflation-adjusted earnings/price ratio examined in the preceding section: relative stability until 1973, followed by a sharp increase in 1974, and a gradual return toward historical values, starting in 1976.

In summary, movements in the ratio of market to replacement value present a picture of fluctuations in the strength of incentives to invest similar to that inferred from movements in the rate of return. Except for a brief period, from 1974 until 1977, when the cost of capital apparently was high relative to its historical average, movements in the ratio of market to replacement value appear to have been dominated by movements in rates of return. The relatively high cost of capital during the mid-1970s, however, may have further weakened incentives to invest. Favourable movements in both the rate of return and the cost of capital had probably re-established fairly strong incentives to invest in late 1978-early 1979.

(1) 1963-1967 only; see footnote 1 on p. 13.

(2) This is strictly correct only if super growth opportunities (i.e., investment opportunities at rates of return higher than normal) and personal tax effects on securities valuation are ignored. At the level of aggregation used in the above analysis, it is not possible to say what effects these two factors may have on the estimated cost of capital.

CONCLUSIONS

Following a period of relatively high profitability over the period 1972-1974, rates of return in the corporate non-financial sector fell sharply and remained depressed through 1977. The subsequent recovery in 1978 and early 1979 returned the profitability of capital back to its average level since the early 1960s. This recovery of the rate of return on equity suggests that adequate returns were in place in 1979 to lead to a fairly strong growth of investment.

These movements in rates of return for the total non-financial corporate sector, however, hide significant differences between the rates of return in the energy and non-energy sectors. After-tax rates of return in the energy sector have remained fairly high since 1973, despite a significant fall in rates of capacity utilization and the greater expense involved in finding and developing new sources of energy. These high rates of return will help sustain the growth of investment in the energy sector.

In the non-energy sector, despite a strong recovery in late 1978 and early 1979, after-tax rates of return in the first three quarters of 1979 were somewhat lower, on average, than in earlier periods of strong growth in non-residential investment. Within the non-energy sector, rates of return in manufacturing in the first three quarters of 1979 were comparable to rates of return in earlier periods of strong investment growth. Rates of return, however, remained somewhat lower in other non-energy-producing industries.

The effect of higher energy prices on incentives to invest in the non-energy sector constitutes an important area of uncertainty. The available evidence suggests that higher energy prices have reduced average rates of return in the non-energy sector. In the manufacturing sector, however, the effect of higher energy prices has been partly offset in late 1978 and early 1979 by the strong recovery of rates of capacity utilization and a slower increase in wages than in selling prices.

Although incomplete, the evidence available on the evolution of the supply cost of capital suggests that the strengthening of rates of return in late 1978-early 1979 should have resulted in a corresponding strengthening of incentives to invest. While the real cost of capital may have increased in the mid-1970s, the available evidence suggests that the supply cost of capital subsequently fell back toward historical levels during the second half of the 1970s. No evidence was found either of a significant increase in corporate leverage. Such an increase, by raising the risk of default, could have resulted in higher costs of capital.

In the short term, output growth is expected to decline from the 3-percent growth rate recorded in 1979 and a further decline in productivity is also expected. Inflation is also likely to continue at rates close to its current level as energy costs rise. These factors could tend to depress real rates of return and investment profitability in the early 1980s. Over the medium term, the real cost of energy inputs will continue to rise as domestic oil prices are increased. However, although higher energy prices may adversely affect the rates of return on existing energy-intensive capital, the rates of return on new, more energy-efficient capital may remain quite high. Should this be the case, then growth in gross investment would be expected to remain strong as old capital is replaced and the economy adjusts to a more energy-efficient technology. As well, the emergence of higher productivity growth and lower rates of inflation over the medium term should help to maintain real rates of return and investment profitability.

APPENDIX I: DEFINITION OF VARIABLES AND SPECIFICATION OF ESTIMATED EQUATIONS

The specification of the equations relates before-tax rates of return to:

- (a) a cyclical variable: the rate of capacity utilization in the case of the energy industry and the real unit labour cost (the unit labour cost deflated by an output price index) in the case of the manufacturing and other non-energy industries; this latter variable captures both the influence of cyclical variations (as it affects labour productivity) and of changes in the real wage rate;
- (b) the relative price of energy: this is specified in such a way as to reflect the changes for various sectors in the relative prices of outputs and inputs resulting from changes in the relative price of energy products;
- (c) terms of trade;
- (d) the rate of inflation.

The mnemonics used in the presentation of the equations are defined as follows:

BTRR = inflation-adjusted before-tax rates of return.

CAPU = index of capacity utilization.

PE = index of energy prices; for the energy industry, this is a weighted average (1976 weights) of prices of crude oil, natural gas and refined petroleum products sold on domestic and foreign markets (net of export tax and royalties); for the manufacturing and other non-energy-producing industries, this is an index of unit energy costs (total expenditures on energy divided by the volume of energy consumption).

PL = index of compensation per man-hour.

ULC = index of unit labour cost (labour compensation per unit of output).

ISPI = index of industry selling prices for manufactures (excluding petroleum and coal products).

PX = index of export prices (all products).

- PM = index of import prices (all products).
- P = rate of change of domestic demand deflator.
- OPI = price deflator for industrial value added, equal to the ratio of GDP at current and constant 1971 dollars in the relevant industries.

The subscripts ENG, MAN, and ONE indicate that the subscripted variable pertains to, respectively, the energy, manufacturing, and other non-energy-producing sectors. Unsubscripted variables pertain to all sectors.

Estimated Equations, Before-Tax Rates of Return, (1)
Energy, Manufacturing and Other Non-Energy Sectors

Energy⁽²⁾

$$BTRR_{ENG} = 10.74 + 0.17 CAPU_{ENG} + 0.08 \frac{PE_{ENG}}{PL_{ENG}} \\ (29.0) \quad (2.9) \quad (5.0)$$

$$\bar{R}^2 = 0.60, \\ D.W. = 1.09$$

Manufacturing

$$BTRR_{MAN} = 17.78 - 0.64 \frac{ULC_{MAN}}{ISPI_{MAN}} - 0.12 \frac{PE_{MAN}}{ISPI_{MAN}} + 0.36 \frac{PX}{PM} - 0.81 P \\ (11.0) \quad (4.6) \quad (5.9) \quad (2.2) \quad (3.0)$$

$$\bar{R}^2 = 0.78 \\ D.W. = 1.94$$

Other Non-Energy

$$BTRR_{ONE} = 13.18 - 0.90 \frac{ULC_{ONE}}{OPI_{ONE}} - 0.12 \frac{PE_{ONE}}{OPI_{ONE}} + 0.20 \frac{PX}{PM} \\ (46.9) \quad (4.3) \quad (6.7) \quad (2.7)$$

$$\bar{R}^2 = 0.87, \\ D.W. = 1.92$$

(1) Estimation period 1963-1978. Numbers in brackets are t-statistics. Except for the rate of inflation, all independent variables were measured as percentage differences from their 1963-1978 average. This had the effect of putting all variables in the same unit of measurement and facilitates interpretation of the coefficients.

(2) This equation was also estimated with a correction for autocorrelation. The resulting coefficients were only marginally different from those shown above.

APPENDIX II: METHODOLOGY AND SOURCES

The methodology and sources of data used for this study are discussed only briefly in this Appendix. A more detailed background note, "Estimation of the Real Rates of Return on Equity: Methodology and Sources", can be obtained from the Long Range and Structural Analysis Division, Department of Finance.

The corporate financial data used in the construction of the estimated rates of return presented in this study are obtained from Statistics Canada, Industrial Corporations: Financial Statistics, Cat. 61-003. These financial data pertain to the private non-financial corporate sector: unincorporated businesses, crown corporations and other public enterprises are excluded. All non-financial industries, except agriculture, fishing, trapping, construction, and non-commercial services are included. Thus the aggregate or "all industries" estimates pertain to all private non-financial corporations except those in the industries noted above.

Sectoral estimates are presented in the study for the energy, manufacturing, and other non-energy industries. The energy industry is defined to include both the mineral fuels industry and the petroleum and coal products industry. The manufacturing industry is defined as total manufacturing, plus the forestry industry, but excluding the petroleum and coal products industry. Other non-energy industries are defined residually.

The construction of the estimated rates of return on equity presented in this study required that several adjustments be made to the reported financial data in Industrial Corporations. First, some adjustments were performed to make the reported data correspond both to the universe and the economic concepts under study. Second, some adjustments were made to correct the reported data for the hidden costs and gains resulting from inflation.

1. Adjustments to Reported Data

Three adjustments were made to reported financial data: an adjustment to remove holdings of foreign assets and related income; an adjustment to purge the reported financial data for the double-counting of some assets and liabilities; and, a reclassification of some items. These adjustments are discussed briefly in this section.

First, in order to measure rates of return on Canadian operations, an adjustment must be made to reported data to remove foreign assets and related income. Although the foreign operations of Canadian-based multinationals are excluded from the reported data, holdings of shares, bonds, and other long-term loans to foreign corporations and affiliates, and the related income and interest expenses are included in reported balance sheets and income statements. These assets and the related income and expenses were removed from reported balance sheets and income statements. These assets were assumed to be financed by debt and equity in the same proportion as total assets.

Second, in order to measure rates of return on corporate equity, some adjustment must be made to reported data to eliminate the double-counting resulting from intercorporate holdings of shares. Holdings of shares of other Canadian corporations (excluding minority shareholders' interest) are recorded as an asset by the holders of, and as equity by the issuers of, such shares. Aggregate financial statements obtained through summation of individual corporate financial statements, thus, count as corporate assets both the productive assets of the issuing corporation and the financing of such assets in the form of holdings of shares by other corporations. Similarly, aggregate financial statements include as equity both the investment of funds by non-corporate investors and the use of some of these funds by corporations to acquire the shares of other corporations. Unless reported aggregate assets and equity are reduced for intercorporate holdings of shares, the reported magnitudes overstate actual productive assets and invested capital in the corporate sector.

Minority shareholders' interest in subsidiaries arises where a reporting corporation consolidates a subsidiary which is not wholly owned. The amount representing the minority shareholders' equity is recorded as a liability by the majority shareholder and as an asset (holding of shares of other corporations) by the minority shareholders. Aggregate financial statements obtained through summation of individual corporate financial statements, thus, count as corporate assets both the productive assets of the subsidiary (as reported by the majority shareholder) and the portion of their financing corresponding with the minority shareholders' participation. Similarly, the financing side of reported balance sheets includes this item twice: once in the form of the minority shareholders' issues of debt and shares to finance their minority holding, and once as a liability of the majority shareholder.

Unless reported aggregate assets and liabilities are reduced for minority shareholders' interest, the reported magnitudes overstate actual productive assets and liabilities of the corporate sector.

Corresponding with the adjustments to reported aggregate balance sheets for intercorporate holdings of shares and minority shareholders' interest, an adjustment must be made to reported income statements. This is because dividend earnings on intercorporate holdings of shares appear twice in reported aggregate income statements: once as income from operations by the paying corporation, and once as dividends received by the corporate holder of shares. Unless reported income is reduced for such dividends, the reported magnitudes overstate the income of the corporate sector.(1)

Third, deferred tax liabilities, reported in corporate financial statements as liabilities, are reclassified as equity. This reflects the fact that ongoing firms are likely to generate sufficient capital cost allowances on a continuing basis to defer payment of the liability indefinitely. This treatment of deferred tax liabilities is in accord with the conclusion of the Ontario Committee on Inflation Accounting.(2)

Finally, the adjustments to reported income statements discussed above require that an adjustment be made to taxes paid in estimating after-tax profits and rates of return. Taxes paid on income from Canadian operations were estimated by scaling actual tax payments for the ratio of estimated income from Canadian operations to total reported income.

2. Adjustments for Inflation

Four adjustments were made to correct reported income for the effects of inflation: charges for the use of fixed assets and materials from inventory were measured on a current rather than an historical cost basis; charges were imputed against income for the maintenance of the real value of working capital; and, an adjustment was made to remove the inflation-related amortization from reported interest payments. The rationale for these adjustments was discussed in the text. The methodology and sources of data used in making these adjustments are reviewed briefly in following Sections 2.1 to 2.4. The measurement of inflation-adjusted rates of return also requires that some adjustments be made to reported equity. The measurement of inflation-adjusted equity is discussed in Section 2.5.

(1) It should be noted that these adjustments to reported aggregate balance sheets and income statements for intercorporate holdings of shares (including minority shareholders' interest) are based on the assumption that both the holding and issuing corporation are part of the relevant universe. This assumption is likely better in the case of estimates of rates of return for the total non-financial corporate sector than in the case of estimates for different industries. However, in the absence of information on intra and inter-industry holdings of shares, the assumption is also maintained at the more disaggregated level.

(2) Report of the Ontario Committee on Inflation Accounting, June 1977, p. 129.

2.1 Adjustment for Capital Depreciation

Depreciation is defined to include depreciation expense on buildings and equipment, depletion expense on depletable assets and the amortization of special tooling costs (applicable to the transportation equipment industry). Depletable assets are thus treated in the same way as depreciable assets.

Depreciation expense is equal to the proportion of gross fixed assets used up each year in production. The estimation of current dollar depreciation thus requires knowledge of the pattern of depreciation of fixed assets and estimates of the stock of gross fixed assets at current prices. As regards the pattern of depreciation of fixed assets, assets were assumed to depreciate on a straightline basis over a 19-year period. This assumption seems to correspond fairly closely with the practice followed by non-financial corporations for financial statement purposes. This assumption, together with a gross investment series and a price index for capital goods, were used to generate estimates of gross fixed assets at current prices, current dollar depreciation, and net fixed assets at current prices.

For the period 1943-1962, estimated investment expenditures by the private corporate sector were obtained from the Construction Division of Statistics Canada. This estimate was obtained by applying the ratio of private corporate to total investment in each year (derived from tax records) to the estimate of investment by all sectors contained in Statistics Canada, Fixed Capital Flows and Stocks, Cat. 13-211. For the period after 1962, estimated investment expenditures were obtained directly from Industrial Corporations: Financial Statistics as the yearly change in net depletable and depreciable assets plus depreciation and depletion. The ratio of gross investment in current and constant 1971 dollars obtained from the Construction Division of Statistics Canada was used as the estimate of the price of capital goods.

2.2 Adjustment for Inventory Valuation

Estimates of the IVA and associated year-end inventory stock data were obtained from the GNP Division of Statistics Canada for the years 1963-1978. These data pertain to all sectors (i.e., public enterprises, the private corporate sector and unincorporated businesses). The IVA for the private non-financial corporate sector was obtained by scaling the estimates for IVA from the GNP Division by the ratio of end-year inventory as reported in Industrial Corporations: Financial Statistics to the corresponding GNP Division estimate.

2.3 Adjustment for the Fall in the Real Value of Working Capital

For the purpose of this adjustment, working capital is defined as net holdings of non-interest-bearing financial assets. Non-interest-bearing financial assets are defined as the sum of cash, demand deposits, accounts receivable and other current assets. Non-interest-bearing financial liabilities are defined as the sum of accounts payable and other current liabilities. The price index used to measure the fall in the real value of net holdings of non-interest-bearing assets was the domestic spending deflator.

2.4 Adjustment for the Overstatement of the Cost of Borrowed Funds

The calculation of inflation-adjusted profits requires both that reported costs be reduced for the principal repayment component of nominal interest payments and that reported income be reduced for the similar principal repayment included in the nominal interest receipts of corporations. Both purposes can be achieved simultaneously by applying the adjustment to the net interest-bearing liabilities of the corporate non-financial sector. For the purpose of this adjustment, interest-bearing liabilities were defined to include all short-term loans and long-term debt of corporations (bank loans, loans from affiliates, bonds, mortgages, etc.). Similarly, interest-bearing assets were defined to include short and long-term loans and advances to affiliates, and holdings of bonds, debentures, commercial paper, term deposits, investment certificates and mortgages. The fall in the real value of net interest-bearing liabilities was also measured by changes in the domestic spending deflator.

2.5 Inflation-Adjusted Equity

Equity is defined as the sum of common and preferred shares, retained earnings, reserve funds and revaluation gains on net fixed assets. Despite the many inflation adjustments that must be made to reported profits and, thus, to reported retained earnings, few adjustments need to be made to reported equity to obtain an estimate of inflation-adjusted equity. This is because, in the firm's balance sheet, all of the adjustments to accumulated retained earnings lead to a corresponding offsetting adjustment in a "capital maintenance reserve" which is also included in the definition of the firm's equity. This reflects the fact that the inflation adjustments to reported income are adjustments for nominal capital gains and losses which the firm, as an ongoing operation, could not consider as income but which could be realized by the owners of the firm upon liquidation or sale.

The only adjustment to reported equity required to obtain a measure of inflation-adjusted equity is an adjustment for the valuation of net fixed assets. This is because, in an inflationary environment, the current value of a firm's net fixed assets exceeds the unamortized historical value shown in the firm's balance sheet. This appreciated current value of net fixed assets reflects the discounted or present value of future earnings and is thus part of the owner's equity. In the case of net depreciable and depletable assets, current value estimates were obtained as explained in section 2.1 above. In the case of land, it was assumed that the appreciation over acquisition costs was proportional to that for structures (building construction).

3. The Ratio of Market to Replacement Value

The ratio of market to replacement value is defined as the ratio of the market value of corporate shares to the replacement value of corporate equity. Estimates of market value were obtained as the sum of the estimated market values of common and preferred shares. The market values of common and preferred shares were estimated by dividing reported annual dividends by average dividend yields for the corresponding year. Total reported dividends in Industrial Corporations: Financial Statistics

were separated into their preferred and common components on the basis of the distribution of common and preferred dividends for the sample of corporations included in the Financial Post's Fundamental Facts data base. The dividend yield used for preferred shares was obtained from Moss, Lawson and Co., while the dividend yield used for common shares is the Toronto Stock Exchange Composite dividend yield adjusted to remove industries not included in the Industrial Corporations universe (i.e., financial services, management companies, real estate and construction). Replacement value, by definition, is equal to inflation-adjusted equity. However, in order to have comparable estimates of market and replacement values, the concept of inflation-adjusted equity used to calculate the ratio of market to replacement value was redefined to include the equity-financed portion of foreign financial assets and intercorporate holdings of shares.



